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ABSTRACT

Projected workforce requirements in 1990 were related to trends in degrees awarded. A Delphi panel discussed impacts of new technology and problems of technical worker supply in the field of communications, which was used as an example of a changing industry. Delphi participants were provided information about past employment and were told about the forecasts of the Bureau of Labor Statistics' model. After estimating the size of the labor force, the panel projected the number of jobs by 1990. The group also discussed growth trends in communications technology, including problems of supply and the nature of teamwork required in the changing industry. After examining projections and trends for the communications industry as a whole, the panel considered the radio and television broadcasting industry and specific occupations within those industries. It is suggested that since new technologies are creating new job categories, community colleges in particular will have to be flexible and responsive to the changing needs of the industry in order to provide the number of technicians and the team mix required. Implications for policy include an urgent need for college-level teachers of science, math, and engineering; higher standards for math and science in our public schools; and national priorities for workforce training before the end of the 1990s. (SW)

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Communication Industry Needs and Higher Education Programs: What Are We Doing Now to Prepare for 1990?

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July, 1982

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Abstract

Projected workforce requirements in 1990 were related to degrees awarded trends. A Delphi panel then discussed impacts of new technology and problems of technical worker supply in the field of communications. Implications for policy included an urgent need for college-level teachers of science, math, and engineering; higher standards for math and science in our public schools; and national priorities for workforce training before the end of the 1990's.

Introduction

How do you translate national projections of employment into implications for program development at the college and university level? A brief look at the U.S. Bureau of Labor Statistics National Industry-Occupation Employment Matrix is enough to discover problems in using the employment projections directly. The complexity of the forecasts to 1990 arises from the size of the database. It divides 425 occupations among 260 industry sector categories. Moreover, the assumptions of the model anticipated a better economy than we are now experiencing. Clearly an alternative scenario is needed.

The communications industry was used as an example of a changing industry. To modify the scenario of the 1990 projections, a Delphi panel was assembled. They considered the revolution in technology, and compared the 1990 employment projections with degrees awarded information of the National Center for Education Statistics. With actual high unemployment and high inflation rates during the Eighties, a picture emerged of changing career opportunity in this new-technology industry. We may have to re-examine college and university policies for selective program planning. To meet industry needs, and to insure a role for college programs, we will have to understand the forecasts, and add what we know from ongoing developments.

Before reviewing the Delphi discussion, it is useful to consider the assumptions of the model used by B.L.S. These assumptions permitted the forecasters to speculate about employment in 1990, so that they could derive workforce implications.

Assumptions and Expectations

The B.L.S. model assumed a better economy than we are experiencing in the 1980's. Explicit assumptions behind the B.L.S. forecasts included the following:

1. congressional passage of the tax reduction of 1981;
2. continuing population trends reflecting high and low birth rate cohorts;
3. unemployment at 8 percent, with a trend toward 6 percent in 1990;
4. inflation, as measured by the private GNP deflator, at 9 percent in the 1980-85 period; and 8 percent in the 1985-90 period.
5. increasing purchases of services (40 percent of consumption in 1955, and 47 percent in 1980) relative to goods;
6. probable declines in residential investment after 1985 due to demographic effects;
7. foreign trade, increasing share of GNP;
8. costly defense expenditures.

Next, we will discuss what the experts talked about as they tried to imagine the employment scenario for 1990.

The Delphi Process of Dialogue

The process of dialogue was simple. Participants were given information about past employment. At least two points in time were used. They were also told about the forecasts of the model. Participants would have one round of preliminary estimates about employment in a future year. They would then discuss reasons for their estimates. They would revise their first estimate, if new insights appeared to favor a different future, in a second round of the process.

In order to give everyone a common frame of reference, the "big" picture" was presented first. The question: how many workers and how many jobs would we see in the U.S. by 1990? The B.L.S. model allowed for nearly 125 million jobs and 117 million workers in 1990.

Workforce Scenario for 1990 and Beyond

As a "warmup" for detailed estimates later, the size of the labor force was considered first. According to data of the 1970's, if the underlying trend continued unchanged, the labor force would reach 130 million by 1990. But the workshop group felt the increase would be slower. It would reach 125 million by 1992 (median figure). Changes in estimates between the "first approximation" and the "second approximation" were informative. The discussion had led participants to believe the labor force would increase more slowly than they originally thought.

Number of jobs was the next question. If the trend of the last several years were to continue, there would be only 99.9 million job slots by 1990. The forecast of the B.L.S. model, however, was 117 million job slots by 1990. In reaction to this information, the workshop group estimated that the number of job slots would reach 120 million by 1992 (median figure). They had no way of knowing how this related to labor force estimates. These figures were analyzed later. Their figures yielded an unemployment rate of only four percent in 1993.

Delphi Group Discussion

Next, the workshop group discussed growth trends in communications technology. The purpose was to identify implications for employment projections. Problems of supply would also be considered. Still another factor would be the nature of the teamwork required in the changing communications industry.

New technologies are creating jobs that defy existing occupational categories. Typist and keypuncher roles, for example, are being changed by word processing. Since the tasks and functions behind job classifications are changing, occupational forecasts get harder to interpret. Estimating new positions and replacement needs at a future date thus becomes more of a problem. Community colleges in particular will have to remain flexible and responsive to the changing needs of communications-related industries, so as to provide the number of technicians and the team mix required.

But, the U.S. also faces a problem of getting enough engineers to meet industry needs. Our high schools are graduating students weak in science and mathematics. Our high demand for engineers, coupled with the restricted supply, is resulting in high salary offers for qualified people. Universities cannot pay engineering professors enough of a salary to compete with private sector wages and thus have trouble retaining quality faculty. One possible solution would be cooperative relationships between private industry and engineering schools. Industry can provide instructors and on-site training. The cost would be reduced independence for academic departments. Large corporations are already training their own engineers. There are signs they could abandon reliance on the educational establishment entirely.

Employment growth in high technology communications will be related to the capital investment required. Most new job growth has historically been in small business establishments. These small businesses are currently under great fiscal pressure. Perhaps the biggest problem is high interest rates. Costs of staff retraining must also be considered. The total picture of team function and roles needs to be related to costs and productivity in each business tied into communications and information.

Both the AT&T divestiture and "new enterprise" opportunities for increased competiton suggest a prospect of small business proliferation. It is likely, however, that time will eliminate many of these new establishments. A few large, dominant firms will probably emerge at a later date. Meanwhile, an opportunity will be found for many new jobs in small businesses able to get the start-up capital to make a new venture in communications.

Cable technology is one example of opportunity for small business establishments. But long-range job growth associated with cable communications may be less than the job seekers hope for. Cable could cause a decline in other industrial sectors, such as recreation and entertainment services. Moreover, many cable-related functions will be performed by people in existing occupations and jobs. The new positons could involve marketing and clerical roles, rather than creative production people. This will depend, of course, on consumer demand or preference for locally originated materials, and the degree to which we start using local telecommunications for non-entertainment purposes. For those who value community access, the most desirable scenario is energetic local participation in setting program priorities. This would include generous local origination, resulting in more production jobs.

After the discussion the participants of the workshop made their second estimated employment projections. A summary and analysis of these projections follows.

Communications Industry Forecasts

The Delphi group looked at projections and trends for the communications industry as a whole, for the radio and TV broadcasting industry as a communication specialty, and at specific occupations within those industries.

Looking first at the communications industry, the group estimated that employment growth in the industry would remain stable through 1990. This would continue the 1970's trend in communications as a whole, and in the technical occupations within communications. In addition, growth of computer software specialists was expected to accelerate beyond the 1970's trend. But employment of writers, artists, and entertainers by the industry would decelerate during the Eighties.

Compared with B.L.S. forecasts for 1990, the group projected more employment in the communications industry as a whole, and more computer specialists within the communications industry. The group estimated lower 1990 employment levels than B.L.S. for technologists, as well as writers, artists, and entertainers within the communications industry.

Within the radio and TV production industry, the workshop group projected that the Eighties growth of engineers and technicians would not be as great as the Seventies growth. This expectation agreed with the B.L.S. projections.

The workshop group also gave estimates of the workforce distribution within the radio and television industry, as compared to the 1978 distribution.

The median projections showed a slight increase in the percentage of secretaries and a five percent increase in the percentage of sales workers. Slight decreases in proportions were estimated for producers, writers, and announcers, and also managers/administrators.

Supply of Communications Workers

The supply side for communications field workers was measured by academic degrees and awards. Graduate level, bachelor's level, and two-year credentials (as recorded by the National Center for Educational Statistics) were considered in turn. The workshop group indicated their belief that the explosion of degreed communications workers into the job market will diminish somewhat in the Eighties. The group's projected number of Doctor's, Master's, Bachelor's, and A.A. degrees in communications fell short of the 1970 trend line.

Perhaps a rationale for these projections was the view that fewer experts could do more with highly advanced technology. And shortages of scientists and mathematicians would impact on supply. The draining off of skilled faculty by industry, for short-term gains in competition, was seen as one problem. Poor science and math training in elementary and secondary schools was a deeper problem. National priorities in education would have to be an issue if the future were to be any different.

Now for the closely related computer information field. Trends of the Seventies had indicated that the concentration of computer programmers and systems analysts in service industries would go from 29 percent in 1970 to 37 percent in 1990. Asked to modify this prediction, the majority of the workforce participants felt the percentage would be higher than 37 percent by 1990.

Clearly the Delphi panel expected much more computer use in service industries (business services, legal, health, education services, etc.). This would be competition for computer specialists in the communications industry sector. What about the supply side? This will be treated next, as measured by degrees and awards.

Computer Specialist Supply

The workshop group felt the Seventies trend line would continue virtually unchanged through 1990 in the awards of graduate and A.A. degrees in computer and information sciences. However, they felt the growth of B.A. degrees awarded in computer science would decrease sharply during the Eighties. Even with a slackening in the rate of growth compared to the trend, the anticipation was still for a tenfold increase in B.A. degrees between 1970 and 1990, asuming enough instructors to meet enrollment demand.

Conclusions

What are we doing nationally to make the most of the communications revolution? Policy-level problems were identified: unique demand for communications workers, enormous problems of technical supply, and changing skill distribution needs in the communications industry.

The demand side is a challenge. We are in a situation of increasing economic and social rewards, declining costs, and great uncertainty of directions for technology. But it is a false problem to say one technology might dominate the others. The people who tell us to be fearful and wait are wrong. Satellites, lasers, cable, and micro-computers will all grow together. Skills in using new systems will transfer to other systems. What is needed is energetic action to develop core skills in using the new technologies, whatever direction they take. These core skills can be integrated into college courses and programs.

On the supply side, either we are doing something stupid, or something very crafty in the self-interest of a few corporations. What industry is doing may be stupid. Everyday commercial employers are stealing bright and capable people from faculty ranks. They do it by paying a lot more money. This is affecting staffing patterns of graduate schools, baccalaureate and community colleges, and even high schools. This theft may be likened to the gambler who shot off his foot to win a $5,000 bet. The quick payoffs available to get short-term advantages involve costly long-term consequences. For a few, something crafty may be going on. Some large corporations are preparing their own workforce internally. They are bypassing existing college and university structures. This could be bad news for science, math, engineering, and communications departments. We may be getting ever fewer narrowly trained technologists, increasingly in control of information flow. Moreover, less than half of private sector industry, the corporations that can concentrate dollars, can do their own workforce development. They train only 20 percent of their workers, leaving 80 percent without systematic improvement.

Of most serious consequences is our national low priority for science and math in elementary and secondary schools. We are engaged in a long-term competition for world markets. Low standards in math and science now will generate huge problems for the American economy after the year 2000. We will even suffer in our national defense capability. Japan and West Germany are making a huge investment in their future workforce. Sweden has a far-sighted approach to provide for its national priorities. This kind of investment will surely pay off. Workforce ability will impact on communications services in the United States, as well as worldwide, during the next generation. To maintain world leadership, we need better math and science standards in our high schools. Somehow we need to get more and better teachers. We could pay them more, on a differential basis. Or we might borrow them from private industry. But we had better do something promptly, and systematically.

Changing workforce distribution in the communications industry will be another challenge. New infrastructures of communicators are forming in the public and private sectors. New people networks are a response to new technologies, such as new cable systems, satellites, and narrowcasting, laser systems, and microcomputer-based telecommunication replacing some of our present mail service. New workforce infrastructures are now needed, just as aviation and space technology employed many people in new ways, to accomodate different kinds of economic and social behavior.

New infrastructures of productive workers will reflect new communications technology on the one hand, and changed communicator activity on the other. While supply-side problems will constrain increases of engineers and technicians, technical people still need to keep up. Higher education, especially community colleges, will be able to help with skill updates or retraining. Increased needs are foreseen for marketing and market research people. But creative writers, producers, and entertainers are not likely to have more job options. Enormous changes would need to happen in local taste and choice, e.g., in response to local programming of 100-channel cable systems, before advertiser behavior would change. There is no adequate incentive system to support local creativity.

The greatest growth and opportunity are foreseen in non-entertainment applications of telecommunication. New ways of banking and shopping are on their way. We will see new forms of work in electronic cottages. Some telecommuting will replace gasoline engine travel. This is likely to reduce the five-day commute for jobs that don't require personal presence. Distance diagnosis of phone problems, moreover, will probably reduce but not eliminate local need for phone trucks. With these new directions going on, higher education would do well to become partners in local economic development.

Perhaps the best initiative for colleges and universities will be to get in the communications act themselves. Commitment is needed to use telecommunication to reinforce and support existing campus functions. The microcomputer, for example, can fit in well with faculty goals and incentive structures. Microcomputers will enhance and improve teacher-learning communication over phone or cable lines. Result: fewer trips for student

and teacher alike. Big mainframes have never transformed higher education delivery systems. Distance learning has never been effective, compared with presence learning. But with microcomputers and modems, the professor can be more in control. What's the use of the student driving 20 miles for a weekly quiz when tele-testing will do?

Changed behaviors required of support people, such as word processing specialists, are now demanding a new approach to education. Responsive roles for higher education will include more teleconferences, workshops, and seminars, rather than more 16-week courses and 2, 4, or 6-year programs. We will need to re-examine institutional roles, as well as faculty roles, in the context of the communications revolution.

We need a national priority for workforce preparation to meet the new technology conditions of the 1990's. Conservatives try to preserve the good things of the past. Liberals press on toward the good things of the future. Affecting conservative and liberal alike will be a vastly new technology. What we can keep and what we must change will be debated. Out of this debate, we can have a hope for stronger national leadership, re-direction of funding, and exciting new roles for college and university departments to prepare communications specialists for the 21st Century.

Paul Larkin

Bastille Day
July 14, 1982

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Technical Note: Employment by industry data was taken from the low trend projections from B.L.S. Bulletin 2121; the breakdown by occupations within industries was taken from B.L.S. Bulletin 2086. The corresponding industry totals were similar.